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MIL-STD-3001-2(AS)
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SUPERSEDING
(See Section 6.)

DEPARTMENT OF DEFENSE STANDARD PRACTICE

DIGITAL TECHNICAL INFORMATION FOR MULTI-OUTPUT PRESENTATION OF TECHNICAL MANUALS

DESCRIPTION, PRINCIPLES OF OPERATION AND OPERATION DATA (PART 2 OF 8 PARTS)

AMSC A7194 **AREA TMSS**

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

FOREWORD

1. This eight-part standard establishes the requirements needed to prepare digital technical information for multi-output presentation of NAVAIR work package Technical Manuals (TMs). The technical content and mandatory style and format requirements contained in this eight-part standard can be used to develop and assemble complete TMs for aircraft weapon systems, aeronautical equipment, airborne weapons/ equipment, and support equipment work package technical manuals. The requirements are applicable for the output of paper technical manuals or for the display of page-oriented, scrollable and frame-based technical manuals on an Electronic Display System (EDS).

2. MIL-STD-3001-2 is Part 2 of 8 Parts and is incomplete without Part 1 and Parts 3 through 8. Part 2 establishes the technical content requirements for the preparation of description, principles of operation, and operating data for aircraft weapon systems, aeronautical equipment, airborne weapons/equipment, and support equipment. This data can be used to develop TMs in a variety of output forms, including interactive screen presentations and page-based, printed manuals.

3. MIL-STD-3001-1 contains general preparation requirements for the multi-output presentation of NAVAIR work package TMs. MIL-STD-3001-2 through MIL-STD-3001-8 contain specific functional technical content requirements for the preparation of all NAVAIR work package TMs and revisions. Parts 1 through 8 are identified below.

MIL-STD-3001-1	Preparation of Digital Technical Information for Multi-output Presentation of Technical Manuals.
MIL-STD-3001-2	Description, Principles of Operation, and Operation Data.
MIL-STD-3001-3	Testing and Troubleshooting Procedures.
MIL-STD-3001-4	Maintenance Information with IPB.
MIL-STD-3001-5	Aircraft Wiring Information.
MIL-STD-3001-6	Structural Repair Information.
MIL-STD-3001-7	Periodic Maintenance Requirements.
MIL-STD-3001-8	Separate Illustrated Parts Breakdown (IPB).

4. MIL-HDBK-3001, Guide to the General Style and Format of U.S. Navy Work Package Technical Manuals, complements this eight-part standard. MIL-HDBK-3001 provides Navy-preferred. nonmandatory style and format requirements for the preparation of page-oriented, scrollable and frame-based work package technical manuals.

5. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Air Warfare Center Aircraft Division, Code 414100B120-3, Highway 547, Lakehurst, NJ 08733-5100 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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1. **SCOPE**.

1.1 Scope. This part of the standard establishes the technical content requirements for the preparation of description, principles of operation, and operating data for aircraft weapon systems, aeronautical equipment, airborne weapons/equipment, and support equipment. This data can be used to develop Technical Manuals (TMs) in a variety of output forms, including interactive screen presentations and page-based, printed manuals.

2. **APPLICABLE DOCUMENTS**.

The applicable documents in section 2 of MIL-STD-3001-1 apply to this Part.

3. **DEFINITIONS**.

The definitions in section 3 of MIL-STD-3001-1 apply to this Part.

4. **GENERAL REQUIREMENTS**.

4.1 General. Sufficient descriptive information and principles of operation necessary for a user to familiarize and comprehend the aircraft weapon system, aeronautical equipment, airborne weapons/ equipment or support equipment shall be developed. In addition, operating data for selected end item equipment shall also be prepared.

4.2 Maintenance level applicability. Requirements contained in this Part are applicable to all types and maintenance levels of TMs unless specifically noted in bold and in parentheses (i.e., **Support Equipment Manuals only**, **Depot Level only**, etc.).

4.3 Selective application and tailoring. This Part contains some requirements that may not be applicable to the preparation of all technical manuals. Selective application and tailoring of requirements contained in this Part shall be accomplished through the use of the Technical Manual Content Selection Matrixes contained in MIL-STD-3001-1, Appendix A. The applicability of some requirements is also designated by one of the following statements: unless specified otherwise by the requiring activity or as/when specified by the requiring activity.

4.4 Preparation of digital data for electronic delivery. Technical manual data prepared and delivered digitally in accordance with this Part of the standard shall be SGML-tagged and assembled using the modular Document Type Definition (DTD). Refer to MIL-STD-3001-1 for information on obtaining or accessing this modular DTD. SGML tags used in the modular DTD are noted throughout the text of this Part in bracketed, bold characters (i.e., <**descopim**>) as a convenience for the TM author and to denote the appropriate tag to be used for the specific information when developing a document instance.

4.4.1 Use of the DTDs. The modular DTDs referenced in this Part interpret the technical content and structure for the functional requirements contained in this Part and are mandatory for use.

4.5 Technical content. Technical content requirements contained in this Part are considered mandatory and are intended for compliance. The content structure for the technical data being developed shall

conform to the associated modular Document Type Definition (DTD) for Description, Principles of Operation, and Operation information. For examples of typical technical content for specific work packages covered in this standard, refer to MIL-HDBK-3001.

4.5.1 Work packages. There are basically two types of work packages (WPs). The first type is an information-oriented work package. It provides support information such as principles of operation, general descriptive information, and controls and indicators descriptions for the weapon system/equipment. Additional data that supports procedural and maintenance tasks, such as lists of materials required, lists of support equipment, etc., are also considered information-oriented WPs. The second type of WP is task-oriented. Task-oriented WPs reflect all required maintenance or operation tasks at the assigned level of maintenance, and environment, material, and support equipment required for each defined task. WPs shall reflect the maintenance concept developed from the Logistics Support Analysis (LSA) or the Logistics Management Information (LMI), the Level of Repair Analysis (LORA), or the approved maintenance plan, and the established repair concept (SM&R Codes).

4.5.2 Style and format requirements. For mandatory style and format requirements for WP technical manuals intended for a printed, page-oriented presentation, refer to MIL-STD-3001-1, Appendix B. For mandatory style and format requirements for the on-screen display of WP technical manuals, refer to MIL-STD-3001-1, Appendix C. For examples of typical technical content for specific work packages covered in this standard and nonmandatory style and format requirements, refer to MIL-HDBK-3001.

4.6 Standard tables and lists. Standard tables and lists are noted throughout the text of this standard in bold and in parentheses (i.e., **(standard table)**, **(standard list)**). The table and list head titles and structure of these standard tables and lists shall have no deviations.

5. **DETAILED REQUIREMENTS**.

5.1 Preparation of descriptive information, principles of operation and operation data. Descriptive information shall be developed for the overall aircraft weapon system and contained in a General Aircraft Information Module <**genacim**>. Descriptive information, principles of operation and operation data shall be developed for major aircraft systems, aeronautical equipment, airborne weapons/equipment, and support equipment and contained in a Description and Operation Information Module <**descopim**>. Both information modules shall be logically subdivided into information- or task-oriented work packages.

5.2 Work package content. Each work package developed for descriptive information, principles of operation, and operation data shall consist of the following:

a. Title block.

b. Work package information.

c. Required descriptive, principles of operation, or operation data.

5.2.1 Title block <**titleblk**>. For page-based TMs, refer to MIL-STD-3001-1, Appendix B, B.5.3.2.1.1 for work package title block content requirements. For **ETMs/IETMs**, refer to MIL-STD-3001-1, Appendix C, C.5.4.1.3.

5.2.2 Work package information **<wpinfo>**. Each work package developed for descriptive information, principles of operation, and operation data may begin with a reference material list, a record of applicable technical directives and a support equipment required list, if applicable. For **ETMs and IETMs only**, additional work package information shall be required. Refer to 5.2.2.4.

5.2.2.1 Reference material list **<reflist>**. Reference material required to complete a task or discussion within a WP shall be contained in a reference material list (**standard list**). If no reference material applies, the heading "Reference Material" shall be omitted from the work package. Guidelines for developing the reference material list are provided below.

a. Only those publications required for performance of the task covered by the WP should be included in the reference material list.

b. Publications such as guides or standards which are not directly needed to accomplish the task (backup informational material or bibliography) should not be listed in the reference material list even if cited in the WP text.

c. Each entry in the list shall consist of:

(1) A title. Referenced publications within the WP by title. If the reference is to a specific WP, the WP title should be listed below the related publication title.

(2) A number. The appropriate publication or WP number.

d. The maintenance level of publications listed is not required.

e. Referenced publications shall be presented by title in alphabetical order. The publication title, WP title and WP number shall also be identified. When two or more WPs are referenced in the same manual, they should be listed in numerical sequence; repetition of the manual title and publication number is not required.

f. Additional WPs within the same manual that are required to complete the task or discussion should be presented first in numerical sequence. The WP title and WP number shall also be identified. The publication number is not required.

g. Referenced publications not prepared in WP format shall be presented in numerical sequence. The title and publication number shall also be included.

5.2.2.2 Record of Applicable Technical Directives **<ratd>**. Technical directives applicable to a specific work package shall be listed in a record of applicable technical directives list (**standard list**). If no technical directives apply, the heading "Record of Applicable Technical Directives" shall be omitted from the work package. The record of applicable technical directives shall be prepared in accordance with the following guidelines.

a. All issued technical directives having any impact on the WP shall be listed upon incorporation into the WP.

b. Approved engineering change proposals (ECPs) that have no effect on retrofit of the end item shall not be listed in the record of applicable technical directives (e.g., "no technical directive will be issued").

c. All technical directives and related ECPs or Rapid Action Minor Engineering Changes (RAMECs) shall be listed upon incorporation into the WP:

(1) "TD Type/No." - Enter the type and number of the technical directive, e.g., "A6 AFC 454" or "AVC 1492." Note: The "TD Type/No." is identified on the Change Control Board (CCB) formal letter of ECP or RAMEC approval. Refer to NAVAIR 00-25-300.

(2) "TD Date" - Enter the date of issue of the technical directive. If the number of the technical directive has been assigned but the directive has not been issued, a dash (-) shall be entered.

(3) "Title and ECP/RAMEC No." - The title of the technical directive and the ECP number or RAMEC, if applicable, shall be listed. If a technical directive listed is the direct result of an approved ECP or RAMEC, the acronym ECP or RAMEC and number shall be shown in parentheses following the technical directive title.

(4) "Date Inc." - The date the information affected by the technical directive or the ECP was incorporated into the WP.

(a) If the technical directive number has been assigned and the directive has not yet been issued (retrofit program), but the ECP that incorporates the change in the production program has been approved, the production ECP coverage shall be included, and the notation "Production coverage only" shall be entered under "Remarks."

(b) When the retrofit TD is approved and incorporated in a change or revision following the incorporation of the production ECP coverage, the TD date of issue shall be entered under "TD Date," the notation "Production coverage only" shall be removed from under "Remarks," and the date of retrofit coverage incorporation shall be listed under "Date Inc." (in lieu of the production ECP coverage incorporation date).

(5) "Remarks" - Enter any applicable remarks.

5.2.2.3 Support equipment required list **<selist> (operation data only)**. All support equipment (SE), including special tools required to perform operational type procedures shall be listed (**standard list**) immediately following the record of applicable technical directive data. If no support equipment is required, the heading "Support Equipment Required" shall be omitted from the work package. Only those special tools (including torque wrenches) and equipment authorized for use at the level of maintenance covered shall be listed. Items shall be listed in alphabetical sequence by noun nomenclature. Standard hand tools shall not be listed. Illustrations shall not be prepared in support of such lists. When the WP is used by other services or commands that require usage restrictions, the item shall be identified by a symbol following the part number in parentheses. The usage of the symbol shall be explained in a notation (e.g., "(AF)=USAF only," "(NS)=NAVSEA only," "(MC)=MARINE CORPS only").

5.2.2.3.1 Each support equipment entry in the list shall be identified by "Nomenclature," "Part Number" and "CAGE Code." When more than one of the same item is required, the quantity shall follow the nomenclature in parentheses.

5.2.2.3.2 If the WP contains multilevel maintenance procedures and any of the SE items are authorized for use at only certain level(s), the restrictive use shall be indicated by the use of an O, F, G, H, and/or D in parentheses following the item nomenclature. For **Aircraft Engine Manuals** the following special application codes to identify usage restrictions shall be used:

a. "J" shall be used to indicate the first degree engine maintenance level,

b. "8" shall be used to indicate the second degree engine maintenance level, and

c. "9" shall be used to indicate the third degree engine maintenance.

5.2.2.4 Additional work package information <**addwpinfo**> (**ETMs and IETMs only**). In addition to the work package information required in 5.2.2, additional information about the contents of the work package shall be included for each work package. The following types of information should be included, as applicable:

a. Maintenance level.

b. Effectivity.

c. Personnel required.

d. Required conditions/system preparation checklist.

e. Special environmental conditions.

f. General safety instruction.

5.2.3 Required descriptive information, principles of operation and operation data. Descriptive information, principles of operation and operation data shall be developed and divided into work packages. Nomenclature used to identify aircraft weapon systems, aeronautical equipment, airborne weapons/ equipment, and support equipment should remain consistent throughout and between all work packages.

5.2.4 Description work packages.

5.2.4.1 Aircraft general description work packages **(General Aircraft Information and Plane Captain's Manuals only)**. The descriptive work packages listed in 5.2.4.1.1 through 5.2.4.1.9 shall be developed for the aircraft weapon system, as applicable. All descriptive work packages may have an introduction <**intro**>.

5.2.4.1.1 Aircraft general description work package <**acdescwp**>. This work package shall contain the descriptive data requirements for the overall aircraft weapon system listed in 5.2.4.1.1.1 through 5.2.4.1.1.3, as applicable.

5.2.4.1.1.1 Aircraft description <**acdesc**>. A brief description of the aircraft and its mission capabilities shall be provided. A detailed definition of systems and subsystems shall not be included.

5.2.4.1.1.2 Aircraft dimensions <**acdim**>. Illustrations showing the external dimensions of the aircraft shall be provided.

5.2.4.1.1.3 Aircraft materials distribution <**acmats**>. The types of material that comprise the aircraft airframe skins and doors shall be identified. Supporting illustrations shall be used to locate and differentiate the types of airframe materials.

5.2.4.1.2 Aircraft arrangement work package <**acarrgwp**>. This work package shall describe and identify the major sections of the aircraft, such as fuselage, wings, empennage, and booms.

5.2.4.1.3 Aircraft systems description work package <**acsysdescwp**>. This work package shall contain brief descriptive data <**sysdesc**> that includes the purpose, type, content and main features of each of the aircraft's major systems. Illustrations shall not be used to support the descriptive data.

5.2.4.1.4 Aircraft instrument panel location work package <**acpnlwp**>. A description and location of cockpit, instrument panels, and consoles shall also be provided. Supporting illustrations shall be used to locate all instrument panels and consoles in the aircraft.

5.2.4.1.5 Danger areas and precautionary measures work package <**dangarwp**>. Safety information, such as hazardous areas on, in, and around the aircraft shall be clearly identified. Information on ground run-up areas, movable surfaces, personnel survival equipment (ejection seat), no-step areas, handholds, walkups, physiological hazards, safety pins, and safety precautions peculiar to the aircraft shall be shown on one or more line drawings. Illustrations showing the hazard areas which exist during ground and air operations with radar systems turned on, both singly and in combination, shall be prepared. The illustrations shall provide safe separation distances and distribution patterns for personnel and Hazards of Electromagnetic Radiation to Ordnance (HERO) unsafe ordnance. Distances shall be presented in meters as well as feet. The safe separation distances shall be calculated and measured by the methods shown in ANSI C95.3-73. The safe exposure level of personnel to electromagnetic radiation is defined in ANSI C95.1-91. Safe exposure levels of HERO susceptible and HERO unsafe ordnance are functions of radar frequency as shown in NAVSEA OD 30393.

5.2.4.1.6 Aircraft stations work package <**acstawp**>. Station numbers shall be identified with their exact location by connecting lines. The location of station zero shall be clearly identified in the diagram. The zero water line of the aircraft shall be indicated on the fuselage drawing. The numbering system used to identify aircraft coordinates and stations shall be used consistently throughout all work packages.

5.2.4.1.7 Aircraft dimensions work package <**acdimwp**>. The dimensions to stations from a reference or datum line shall be identified in this work package. Illustrations shall be included to effectively convey this information.

5.2.4.1.8 Aircraft access and inspection panels and provisions work package <**acacesswp**>. This work package shall identify all aircraft access and inspection panels and provisions. Illustrations shall be included to effectively convey this information.

5.2.4.1.9 Aircraft external power source connections work package <**acextpwrwp**>. Identification of external power source connections and the authorized power sources that may be connected to the aircraft shall be identified and described in this work package. Illustrations shall be included to effectively convey this information.

5.2.4.2 Aircraft systems, aeronautical, airborne weapons/equipment, support equipment, and engine description work packages. The following descriptive work packages shall be developed for aircraft systems, aeronautical and airborne weapons/equipment, support equipment, and engines, as applicable. All descriptive work packages may have an introduction <**intro**>.

a. Aircraft system, subsystem, and component description work packages.

b. Aeronautical equipment, airborne weapons/equipment, and support equipment description work packages.

c. Engine and engine system description work packages.

d. Programming software description work packages.

5.2.4.2.1 Aircraft system, subsystem, and component description work packages **<descwp>**. A separate description work package shall be developed for each aircraft system. The work package shall contain descriptive data <**sysdesc**> that includes the purpose, type, content, and main features of the system. Other supportive descriptive data <**addesc**> shall be included when it is necessary to describe additional technical data that may relate to, but not be physically integral to, the system/equipment, such as specific operating software. When required, a table of leading particulars or technical characteristics shall be included to present the physical and electrical characteristics of the system and the major functional components. Subsystem <**sysdesc**> and component descriptions <**sysdesc**> shall also be included, when applicable. When necessary for usability or clarity, subsystem and component descriptions may be provided in separate work packages. Subsystem component descriptions may be included in either the subsystem description work package <**descwp**> or in a separate component description work package <**descwp**>. If a system has a relationship to other systems installed in the aircraft, a brief description <**desc**> of these related systems shall also be provided. The purpose, use, and function of all operating controls and auxiliary equipment, or attachments furnished with the system or equipment shall also be included, as applicable (refer to 5.2.4.2.1.1). Illustrations shall support the descriptive data. The illustrations shall identify and locate the system, equipment, and components and their associated access panels, if any. When necessary for usability or clarity, separate description work packages may be used for each aircraft system, subsystem, and individual system component or the descriptive data may be included within the principles of operation work packages (refer to 5.2.5.1).

5.2.4.2.1.1 Controls and indicator descriptions. A description and use of controls and indicators **<ctrlinddesc>** shall be prepared for each equipment, assembly, or control panel having controls and indicators. The coverage should also provide interpretation of typical instrument readings (with acceptable limits stated) and indictor presentations to inform the operator what recognizable results to expect to

observe during each mode of operation. Illustrations shall be prepared to locate and identify all operator controls and indicators and related placard data. Each control and indicator shall be clearly labeled as it appears on the equipment. Controls and indicators that are not labeled shall be identified. The functional use of each control and indicator shall be explained. A table **<ctrlindtab>** shall be used to explain the use of the controls and indicators. When the controls or indicators for a system are situated on more than one panel or equipment, a table for each panel or equipment shall be developed. When it is necessary to provide operating instructions for the system or equipment, controls and indicator descriptions may be included in the operating instruction work packages to facilitate the operating procedures (refer to 5.2.6.1).

a. Illustration. The purpose of the illustration is to identify each control and indicator, placard data, and location. Each control or indicator shall be identified using either an index number (with leader line) identifying the location and related placard data or its official nomenclature. When used, index numbers shall be assigned in logical sequence related to location of the item.

b. Table. The purpose of the table is to provide the required data for each control and indicator. The table will indicate the index number (when used) referenced from the illustration, the associated control or indicator and its decal/stencil nomenclature, including the reference designator, if applicable, and the function of the control or indicator. The following entries shall be provided for each control and indicator listed:

(1) "Figure and Index No." reference, if used.

(2) "Control/Indicator" nomenclature.

(3) "Function."

5.2.4.2.2 Aeronautical equipment, airborne weapons/equipment, and support equipment description work packages **<descwp>**. Descriptive work packages shall be developed for aeronautical equipment, airborne weapons/equipment and support equipment, as applicable. When necessary for usability or clarity, the descriptive data may be included within the principles of operation work packages (refer to 5.2.5.2). The description <**sysdesc**> shall include the following information, as applicable:

a. The purpose, type, content, and main features of the equipment and components. Unusual shapes or special material make-up of equipment or components shall also be described.

b. A table of leading particulars or technical characteristics giving the physical (dimensions, weight, etc.) and electrical (power requirements, output, etc.) characteristics of all major functional components.

c. Illustrations shall support the descriptive data. The illustrations shall identify and locate the system, equipment, and components. For support equipment, the views depicted shall indicate the placement, verbiage, and appropriate indexing for color requirements of all stenciled or painted markings.

d. A description of the controls and indicators. Refer to 5.2.4.2.1.1.

5.2.4.2.3 Engine and engine system description work packages **<descwp>**. A work package shall be developed to provide maintenance personnel with a basic description of the engine <**sysdesc**>, including its purpose, type, series, and main features. A table of leading particulars, including dimensions, weight,

and other basic engine data shall also be included. If more than one model of the engine is used, the significant differences should be explained. In addition, a separate description work package **<descwp>** for each major section or module of the engine shall also be prepared. For usability or clarity, the descriptive data may be included within the principles of operation work packages (refer to 5.2.5.3). Separate description work packages **<descwp>** for each related engine system <**sysdesc**>, subsystem <**sysdesc**> and its major components <**sysdesc**> shall also be prepared. As applicable, the description shall include the system's purpose, type, series, main features, and a table of leading particulars, including dimensions, and weight.

5.2.4.2.4 Programming software description work packages <**softwp**>. Work packages shall be developed to provide descriptive information for programming software used for aircraft systems, aeronautical equipment and test equipment, when applicable. Description of stimulus and measurement programming <**stim-measdesc**>, programming statements <**statedesc**>, and any programming tests or self tests <**progtestdesc**> shall be prepared. A description of any microcircuit logic and associated diagrams shall also be included when necessary. Block diagrams, test setup diagrams, and pictorials of display readouts shall be included when necessary to support the descriptive narrative. All descriptive work packages may have an introduction <**intro**>.

5.2.5 Principles of operation. The principles of operation shall define the purpose and functions of the equipment, the technical characteristics and other general information to be used by maintenance personnel to enable understanding of the equipment and its related systems, including integration. The operation of the system and related equipment/components shall be presented in a logical flow. Significant input, output, and control signals, supply voltages and power supply output voltages shall be identified. If the equipment operates in more than one mode, each mode shall be explained. Functional block diagrams shall be provided. When the LSA/LMI/MP directs fault isolation to the bit and piece component(s), the principles of operation shall describe detailed circuitry. Internal circuits, their relationship to each other, input and output signals, waveforms and time-phase relationship to significant waveforms shall be included when required to understand detailed equipment operation. Presentation of the principles of operation shall be supported by program listings and functional flow, logic, or other diagrams required to ensure clarity of presentation. Logic diagrams may include system operational modes. These diagrams and other related illustrations shall be placed in the same work package as their related text. Principles of operation for functionally significant nonrepairable items shall be described as necessary to support understanding of the system or equipment. Basic theory, normally found in textbooks, shall not be included. Principles of operation data shall be contained in the following types of work packages, as applicable:

a. Aircraft weapon system principles of operation work packages.

b. Aeronautical equipment, airborne weapons/equipment, and support equipment principles of operation work packages.

c. Engine systems principles of operation work packages.

d. Schematic diagram work packages.

5.2.5.1 Aircraft weapon system principles of operation work packages <**popwp**>. A separate principles of operation work package shall be developed for each aircraft system. All principle of operation work packages may have an introduction <**intro**>. The work package shall contain the functional operation for

the system <**systhry**>, its subsystems <**systhry**> and components <**systhry**>. Detailed physical descriptions of the systems and components may be included here when usability is enhanced (refer to 5.2.4.2.1). When descriptive data is included, it is not necessary to prepare separate description work packages. The descriptive data shall precede the narrative for the principles of operation. When necessary for usability or clarity, subsystem <**popwp**> and component <**popwp**> principles of operation may be provided in separate work packages. Subsystem component principles of operation may be included in either the subsystem principles of operation work package or in a separate component principles of operation work package. Detailed component functional operation, common circuitry and wiring diagrams shall not be included unless necessary to understand system/subsystem function.

5.2.5.2 Aeronautical equipment, airborne weapons/equipment, and support equipment principles of operation work packages <**popwp**>. Principles of operation work packages shall be developed for aeronautical equipment, airborne weapons/equipment and support equipment, as applicable. All principle of operation work packages may have an introduction <**intro**>. Detailed physical descriptions **<sysdesc>** of the systems and components may be included here when usability is enhanced (refer to 5.2.4.2.2). The descriptive data shall precede the narrative for the principles of operation. When descriptive data is included, it is not necessary to prepare separate description work packages. The principles of operation **<systhry>** should consist of a functional narrative written to help understand the equipment operation (electrical/electronic, hydraulic, pneumatic, and mechanical.) When necessary, principles of operation may be divided into simplified and detailed principles of operation and contained in separate WPs.

5.2.5.3 Engine systems principles of operation work packages <**popwp**>. A separate work package explaining the operation **<systhry>** of the engine and each of its systems shall be prepared. All principle of operation work packages may have an introduction <**intro**>. Detailed physical descriptions **<sysdesc>** of the systems and components may be included here when usability is enhanced (refer to 5.2.4.2.3). The descriptive data shall precede the narrative for the principles of operation. When descriptive data is included, it is not necessary to prepare separate description work packages. Information such as compressor stages, combustion chamber arrangement, and location of major sections, modules, components, and accessories shall be presented. The principles of operation shall consist of functional narrative written to facilitate understanding of the engine systems to the extent necessary to support fault detection and isolation and maintenance of the systems. This text shall describe system operation and the relationship of other systems/components during system integration.

5.2.5.4 Schematic diagram work packages <**schemwp**>. Schematic diagrams required to support the principles of operation or the testing and troubleshooting of systems, equipment and components may be included in separate work packages, especially when a large number of schematics are required. However, when only a small number of schematics are required, they shall be included in the applicable principles of operation or testing and troubleshooting work package. Schematic diagram work packages may include an introduction <**intro**>.

5.2.6 Operation data. Operation instructions shall be developed when the equipment is designed to be operated by a dedicated operator. The operation of support equipment shall be integrated into the testing (checkout) procedures using the support equipment. Operating instructions may also be developed to provide standard basic operating procedures when the equipment is used for testing or maintenance of multiple items (e.g., Automatic Test Equipment (ATE), hydraulic test stands, and portable or mobile power supplies).

5.2.6.1 Operating instruction work packages <**operwp**> (end item). These work packages shall contain step-by-step operation instructions for the equipment, including all safety precautions, covering the complete pre-operational to post-operational cycle. The procedures shall identify all normal and abnormal observations or indications and appropriate action to be taken. Supporting illustrations may be prepared, as necessary, to locate and identify all controls and indicators required to operate and monitor the equipment. All operating instruction work packages may have an introduction <**intro**>. The coverage shall include the technical procedures described below. If necessary, for systems or equipment that have more than one method of operation or several modes of operation, the procedures described below can be repeated for each method or mode in the same work package.

a. Equipment preparation for use <**prepuse**>. As applicable, special procedures shall be prepared for unpacking, removing protective coatings, depreservation, and setting up equipment furnished in a partially assembled state. When the equipment is intended to be anchored or mounted in a fixed location and installed by a supporting facility, installation procedures are not required. If containers are to be used again, kept for future use, turned in to supply, or require special disposition method, the necessary procedures shall be prepared.

b. Pre-operational setup procedures <**preop**>. Pre-operational setup procedures, including pre-operation setup illustrations and initial switch settings to prepare the equipment for operation, if required.

c. Controls and indicator descriptions. To facilitate the operation procedures, a description and use of controls and indicators <**ctrlinddesc**> may be included for each equipment, assembly, or control panel having controls and indicators. Refer to 5.2.4.2.1.1 for controls and indicator description requirements. If controls and indicator descriptions are provided, they shall not be repeated within the aircraft systems, aeronautical equipment, and engine description work packages.

d. Built-in-test or self-test procedures <**bit-st-op**>. Procedures for self-testing the equipment when built-in-test (BIT) feature or self-test capability is provided. These procedures are normally integrated into the operating procedures, but may be required as part of the pre-operational setup procedures. If this information is contained in another document, reference shall be made to the applicable document.

e. Operating procedures (normal sequence of operation) <**op-proc**>. Step-by-step procedures for operation of the equipment in normal sequence of operation. If this information is contained in a test program instruction or another technical manual, reference should be made to the applicable document.

f. Emergency operation <**emerg-proc**>. Step-by-step procedures by "functional mode" or "emergency condition," detailing the operating procedures with proper warnings or cautions, that can be performed without further damage to the equipment. The procedures shall identify any different indications or observations with appropriate actions to be taken. When the equipment should not be operated with a specific "functional mode(s)" or "emergency condition," this requirement shall be clearly identified with appropriate warning or caution.

g. Emergency shutdown procedures <**emshut-proc**>. Emergency shutdown procedures with cautions to be observed, including warnings as to safety of operations to prevent injury to operating personnel.

h. Post-operational shutdown procedures <**post-op-proc**>. Procedures to return the equipment to

its normal configuration, prior to pre-operational setup, if required.

5.2.6.2 Software loading work packages <**softldwp**>. Work packages shall be developed containing procedures for the identification, loading, initializing and downloading of applicable operational and diagnostic software. Identification of the software shall include the purpose, configuration applicability and version information. Procedures that verify that the proper software has been loaded and is operating properly shall also be included. All software loading work packages may have an introduction <**intro**>.

6. **NOTES**.

The notes in section 6 of MIL-STD-3001-1 apply to this Part.

CONCLUDING MATERIAL

Preparing activity:
Navy - AS
(Project TMSS N273)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.

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I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-STD-3001-2(AS)	2. DOCUMENT DATE (YYYYMMDD) 2000/11/15

3. DOCUMENT TITLE

Description, Principles of Operation, and Operation Data

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER		
a. NAME *(Last, First, Middle Initial)*	b. ORGANIZATION	
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8. PREPARING ACTIVITY	
a. NAME COMMANDER NAVAL AIR WARFARE CENTER AIRCRAFT DIVISION	b. TELEPHONE *(Include Area Code)* (1) Commercial (732) 323-2947 (2) DSN 624-2947
c. ADDRESS *(Include ZIP Code)* CODE 414100B120-3 HIGHWAY 547 LAKEHURST, NJ 08733-5100	**IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:** Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman Road, Suite 2533 Fort Belvoir, Virginia 22060-6221 Telephone (703) 767-6888 DSN 427-6888